Introduction

Of the livestock species, poultry appears to be the most suitable and applicable intervention to improve the rural livelihoods; and is important for food security, religious reasons and poverty alleviation in developing countries [1-3]. Nearly all rural and peri-urban families in the developing world keep household poultry [4].

Of the total 59.5 million, poultry population of the country, 90.85%, 4.76% and 4.39% are indigenous, hybrid and exotic breeds, respectively [5]. Local chicken takes the higher percent in the country as well as in the study area of northwestern Tigray in terms of population. However, the output (egg and meat) is low when compared to exotic chicken. The egg production potential of the local chicken is 30-60 eggs per year per hen with an average of 38 grams egg weight under village management conditions. Whereas, exotic breeds produce around 250 eggs per year per hen with around 60 grams egg weight in Ethiopia [6]. Even though the country’s output obtained from poultry is low due to the highly dominance of local chicken, but the output that obtained from keeping poultry plays a great role in contribution age to income and to dietary diversity of the smallholder producers [7,8].

To improve production and productivity of chicken so as to raise its contribution to the societies, Ministry of Agriculture and Rural Development of the country have been multiplied
and disseminated several exotic chicken breeds to the farmers over the last 50 years in the country [9]. Koekoek chicken breed is one of the exotic breed types which are the composite of White Leghorn, Black Australorp and Bared Plymouth Rock [10]. Koekoek breed has a dual purpose, free ranging chicken with laying capabilities as well as a large body size for meat production. In Ethiopia, this breed was demonstrated in different parts of the country including Tigray region. In the study area Tselemti, the Koekoek breed was introduced in 2014 and the breeds was gave promising result in egg production and preferred by different traits such as egg to laying and slaughter, egg hatchability and egg production compared to the local breeds. Therefore, it is important to demonstrate this breed to large farmers of the area.

Objectives

- To demonstrate and popularize Koekoek chickens in the area.
- To evaluate the production performance of Koekoek chickens in the production system of the area.
- To assess the farmers perception towards the introduced chicken breed.

Material and methods

Description of the study area

The trial was conducted at Tselemti district of the northwestern zone of Tigray. Tselemti district is located at 1,172 km North of Addis Ababa, the capital city of Ethiopia and 389km West of Mekelle, capital city of the Tigray regional state and 85km South of Shire. Geographically Tselemti district is located at latitude and longitude of 13° 05’N and 38° 08’ E, respectively, with an altitude ranging from 800-2870 meter above sea level. The district has an annual rain fall of 758mm to1100mm with mean daily temperature that ranges between 16°C to 38°C. The district is known for its mixed farming, crop and livestock in which the crop subsystem dominates over livestock. The major crops of the district are sorghum, maize, finger millet, sesame and rice. From the horticultural crops like banana, mango and papaya and vegetables like hot pepper, onion and tomato are commonly grown in the area. The dominant livestock in the area are cattle, goat, poultry and bee colonies [11].

Selection and Implementation Procedures

The target Kebelle’s Sekota Mariam and Serako is located 20km and 30km respectively from the town of Maitsebri capital city of Tselemti district. The research was conducted from 2018-2019. A total of 60 female headed interested farmers for executing the research were selected purposively from two Kebelles in consultation with development agent and administration bodies of the respective Kebelles. Then after selection training was given to a total of 67 participants including the district experts, development agents and participant farmers. A total of 1264, forty-five days old chicken, which is 20 chicks per participant farmers was offered with the financial support of Operation Research Project (OR).

Data collection and analysis

Important quantitative data such as average body weight of male and female chicken, average eggs weight and average number of egg laying day of the chicken; and qualitative data farmers point of view was collected. The collected data was analyzed using the descriptive statistics such as mean and percentage (Figure 1).

Results and discussions

Comparing weight of Koekoek and local chickens at 12 months age the Koekoek Chickens were heavier both male and female in the study area. Similar to this study Dessie and Ogle [12] have reported that the yearly live body weight of Koekoek were 2.6kg and 1.9kg for both male and female, but the local breeds have lower body weight 1.9kg and 1.6kg for male and female [12]. Gebreselassie et al. [14] also reported that the Koekoek breeds were reached 2.93kg and 1.99kg both cock and hen at 9-month age, while the local chicken weighted 1.97 and 1.06kg both sex (male and female). Similarly, Koekoek were weighted 2.6kg and 1.9kg both male and female sex on yearly ages at southern Tigray, as reported by Temesgen et al. [15].

Moreover, the average egg production performance of the breeds in the study area was 176 and 81 per year with 45.33 gram and 34.8 gram egg weight for both the Koekoek and local breeds, respectively (Table 1). Inline to this study Tadelle and Fasil [16] found that egg production potentials of Koekoek were 196 eggs/bird/year with an average egg weight of 55.7 gram. Desalew in 2012 [17] also reported that the Koekoek breeds yield 187.04 eggs/hen/year. But Lemlem and Tesfay [18] found that local chicken have the egg production of 40-60 with 43 gram egg weight under village management conditions. On the other hand age at first egg was 26.1 and 29.9 weeks respectively for the Koekoek and local breeds. Similar to this
study, Tekalegn et al. [19] was found 26.7 weeks and Gezahnegn et al. [20] was reported that 26.86 weeks age at first egg of the Koekoek chicken breeds. But village chickens are characterized by late maturity and the majority of the birds start laying late at 7–8 months of age [21,22].

The sampled farmers were responded that as the Koekoek chickens are more preferred in their body weight, egg production, egg hatchability, egg marketability, and age at egg laying and slaughtering weight as compared to the local chickens. But on the contrary the farmers were less preferred the breeds in the attributes of brooding ability, escape from predators and chicken marketability as compared to the local chicken (Table 2) (Figures 2, 3).

The main constraints faced in Koekoek chicken production in the area is diseases followed by predators. The predators include such as snake and eale. Mostly this could due to the poor management of the farmers and low vaccination access to the chickens.

**Conclusion and recommendations**

In the study area Koekoek chicken has given higher egg production, body and egg weight as compared to the local breed. The result from farmers response also shows the breeds are promising in most of the attributes such as, age to egg laying and slaughter, egg laying capacity, egg hatchability, and market price of the egg as compared to the local chicken. But farmers were less preferred that the breeds in traits brooding, resistant to diseases, escaping from predators and market preference than the local breed. Farmers becomes interested due to the breed could effectively managed for both egg and meat production under scavenging condition with little supplementation as compared to other improved breeds. By giving strong emphasis on the management aspects like housing, watering, feeding and vaccination; the breeds are promising to the area to enhance the meat and egg production of the poultry. Therefore, the breeds have to be scaled to large farmers of the area.

**Acknowledgements**

The authors would like to thanks the Operational Research Project (OR) for the budget grants. Special thanks also go to TARI/Shire Maitsebri Agricultural Research Center, researchers for their unlimited support. Farmers, experts and development agents of Tselemti district are also deeply acknowledged for their support in conducting the research.

**References**


---

**Table 1:** Comparison of Koekoek and local birds using different parameters.

<table>
<thead>
<tr>
<th>SN</th>
<th>Parameter</th>
<th>Breed</th>
<th>Std. Error difference</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age at 1 year age (kg)</td>
<td>Male Koekoek 2.65</td>
<td>2.01 0.137</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female Koekoek 1.82</td>
<td>1.30 0.169</td>
<td>0.006</td>
</tr>
<tr>
<td>2</td>
<td>Egg production/bird/year</td>
<td>Male Koekoek 176.3</td>
<td>81.4 5.843</td>
<td>0.000</td>
</tr>
<tr>
<td>3</td>
<td>Egg weight (gm)</td>
<td>Male Koekoek 45.33</td>
<td>34.80 2.321</td>
<td>0.000</td>
</tr>
<tr>
<td>4</td>
<td>Age at first egg (in weeks)</td>
<td>Male Koekoek 26.13</td>
<td>29.93 0.502</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Table 2:** Farmers response on Koekoek chicken breed as compared the local breed (n=30)

<table>
<thead>
<tr>
<th>SN</th>
<th>Attributes</th>
<th>Level of Agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Body weight</td>
<td>Very poor</td>
</tr>
<tr>
<td>2</td>
<td>Egg production</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Egg hatchability</td>
<td>6.7</td>
</tr>
<tr>
<td>4</td>
<td>Brooding ability</td>
<td>3.3</td>
</tr>
<tr>
<td>5</td>
<td>Scavenge ability</td>
<td>33.3</td>
</tr>
<tr>
<td>6</td>
<td>Resistance to disease and parasite</td>
<td>16.7</td>
</tr>
<tr>
<td>7</td>
<td>Escape from predators</td>
<td>46.7</td>
</tr>
<tr>
<td>8</td>
<td>Age to egg laying</td>
<td>33.3</td>
</tr>
<tr>
<td>9</td>
<td>Resistance to feed and water shortage</td>
<td>13.3</td>
</tr>
<tr>
<td>10</td>
<td>Egg marketability</td>
<td>26.7</td>
</tr>
<tr>
<td>11</td>
<td>Chicken marketability</td>
<td>3.3</td>
</tr>
</tbody>
</table>

**Figure 2:** Ms. Belaynesh manage her chickens, at S/Mariam Kebelle, Tselemti district, 2018.

**Figure 3:** Hatched Koekoek off springs using the local hen (Ms. Alemayo Yehalay), Serako Rebele, 2019.


